

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously presented) A steerable catheter comprising:

an elongated catheter body including a proximal end, a distal segment and a deflection lumen extending from the proximal end toward the distal segment;

a handle coupled to the catheter body proximal end and including a longitudinal axis; and

a deflection mechanism for selectively inducing a bend in the catheter body; the deflection mechanism comprising:

an elongated deflection wire extending within the deflection lumen of the catheter body and into the handle;

a guide track formed within the handle in substantial alignment with the longitudinal axis;

a thumb wheel mounted proximal to the guide track within the handle and supporting a pinion gear, the thumb wheel and pinion gear adapted to be rotated about a common thumb wheel axis, which extends substantially perpendicular to the longitudinal axis; and

a rack arm including runners received by the guide track, an attachment point coupling the deflection wire to the rack arm and a linear rack engaging the pinion gear; the rack arm extending within the handle, obliquely to the longitudinal axis, from the runners to the linear rack, the attachment point being movable along a linear path that is substantially aligned with the deflection lumen;

wherein rotation of the thumb wheel in a first direction moves the linear rack proximally, via the engagement of the linear rack with the pinion gear, to

draw the deflection wire proximally through the deflection lumen and along the guide track inducing a first bend of the catheter body.

2. (Original) The catheter of claim 1, wherein rotation of the thumb wheel in a second direction moves the linear rack distally, via the engagement of the linear rack with the pinion gear, to push the deflection wire along the guide track and through the deflection lumen inducing a second bend of the catheter body.

3. (Original) The catheter of claim 1, wherein the handle further includes a first major side and a second major side and the thumb wheel is disposed intermediate the first major side and the second major side.

4. (Original) The catheter of claim 1, wherein the handle further includes a first handle body portion and a second handle body portion joined along a plane substantially perpendicular to the thumb wheel axis; the first handle body portion and the second handle body portion capturing the thumb wheel there between.

5. (Original) The catheter of claim 1, wherein
the thumb wheel includes an internal axial extension, a sidewall forming an outer rim and a circumferentially extending slot through the outer rim of the sidewall; and

the pinion gear is formed on the internal axial extension and the rack arm extends through the circumferentially extending slot to engage the pinion gear.

6. (Original) The catheter of claim 1, wherein
the thumb wheel includes a sidewall and an arcuate opening extending therethrough;

the handle includes an inwardly extending guide passing through the arcuate opening holding the linear rack of the rack arm against the pinion gear of the thumb wheel.

7. (Original) The catheter of claim 1, wherein
the thumb wheel includes a first sidewall and a second sidewall joined along a longitudinal plane substantially perpendicular to the thumb wheel axis;
the junction of the first sidewall and the second sidewall forming a circumferentially extending slot through which the rack arm extends; and
the first sidewall including an internal axially extension upon which the pinion gear is formed.
8. (Original) The catheter of claim 7, wherein
the first sidewall and the second sidewall each include an arcuate opening extending therethrough; and
the handle includes an inwardly extending guide passing through the arcuate openings holding the linear rack of the rack arm against the pinion gear of the thumb wheel.
9. (Original) The catheter of claim 3, wherein the deflection mechanism further comprises a securing mechanism selectively engageable in use from either the first major side or the second major side of the handle to apply a friction force, which holds the thumb wheel preventing further rotation of the thumb wheel.
10. (Original) The catheter of claim 9, wherein the thumb wheel includes a sidewall and the securing mechanism comprises a resilient compressible member disposed in a gap between the thumb wheel sidewall and one of the first major side and the second major side of the handle body.
11. (Original) The catheter of claim 10, wherein one of the first major side and the second major side of the handle includes a window and a thumb slide extending therethrough; the thumb slide adapted to apply a lateral force pushing

the thumb wheel against the resilient compressible member thereby engaging the securing mechanism.

12. (Original) The catheter of claim 11, wherein the securing mechanism further includes an elongated ring coupled to the thumb slide whereby the thumb slide applies the lateral force by wedging the elongated ring between the thumb wheel and one of the first major side and the second major side of the handle.

13. (Original) The catheter of claim 10, further comprising means to adjust the gap between the thumb wheel sidewall and the one of the first major side and the second major side of the handle body.

14. (Original) The catheter of claim 3, wherein the handle further includes a first minor side extending between the first major side and the second major side and a first thumb wheel window extending through the first minor side through which a portion of the thumb wheel is exposed.

15. (Original) The catheter of claim 14, wherein the thumb wheel includes a side wall forming an outer rim; the outer rim being exposed through the first thumb wheel window.

16. (Original) The catheter of claim 15, wherein the outer rim includes serrations.

17. (Original) The catheter of claim 15, wherein the outer rim includes an indentation.

18. (Original) The catheter of claim 14, wherein the handle further includes a second minor side, opposite the first minor side, and a second thumb wheel

window extending through the second minor side through which a second portion of the thumb wheel is exposed.

19. (Original) The catheter of claim 18, wherein the thumb wheel includes a sidewall forming an outer rim; the outer rim exposed through the first and second thumb wheel windows.

20. (Original) The catheter of claim 19, wherein the outer rim includes serrations.

21. (Original) The catheter of claim 19, wherein the outer rim includes a first indentation exposed through the first thumb wheel window and a second indentation exposed through the second thumb wheel window; the first and second indentations adapted to engage a thumb and a finger of an operator.

22. (Original) The catheter of claim 1, wherein the guide track includes track sides engaging the runners of the rack arm.

23. (Original) The catheter of claim 22, wherein the rack arm includes an H-shaped cross-section defining the runners.

24. (Original) The catheter of claim 1, wherein the handle includes a first major side and a second major side; the first and second major sides forming a thumb wheel support segment and a grasping segment extending proximally from the support segment; the grasping segment including a narrowed waist facilitating ergonomic handling.

25. (Original) The catheter of claim 24, wherein the thumb wheel is disposed intermediate the first major side and the second major side.

26. (Original) The catheter of claim 24, wherein the first and second major sides are formed by a first handle body portion and a second handle body portion joined along a plane substantially perpendicular to the thumb wheel axis; the first handle body portion and the second handle body portion capturing the thumb wheel there between.

27. (Currently Amended) A steerable catheter comprising:

- an elongated catheter body including a proximal end, a distal segment and a deflection lumen extending from the proximal end toward the distal segment;

- a handle coupled to the catheter body proximal end and including a longitudinal axis and an inwardly extending stationary guide; and

- a deflection mechanism for selectively inducing a bend in the catheter body; the deflection mechanism comprising:

- an elongated deflection wire extending within the deflection lumen of the catheter body and into the handle;

- a guide track formed within the handle in alignment with the longitudinal axis;

- a thumb wheel mounted proximal to the guide track within the handle, the thumb wheel comprising

- an internal axial extension having a circumferential surface offset from the longitudinal axis,

- a sidewall forming an outer rim and a circumferentially extending slot through the outer rim of the sidewall, and

- a pinion gear formed along a portion of the circumferential surface of the internal axial extension;

- the thumb wheel adapted to be rotated to cause rotation of the pinion gear about a common thumb wheel axis, which extends substantially perpendicular to the longitudinal axis; and

- a rack arm comprising runners received by the guide track, an attachment point coupling the deflection wire to the rack arm,

and a linear rack having a first major side and a second major side, the second major side configured to engage the pinion gear,

the rack arm extending within the handle obliquely to the longitudinal axis in order to position the linear rack along the pinion gear formed along the circumferential surface offset from the longitudinal axis and position the runners in the guide track in alignment with the longitudinal axis,

the attachment point being movable along a linear path that is substantially aligned with the deflection lumen in response to rotation of the pinion gear causing linear movement of the runners in the guide track via the obliquely extending rack arm and linear rack;

wherein rotation of the thumb wheel in a first direction moves the linear rack proximally, via the engagement of the linear rack with the pinion gear, to draw the deflection wire proximally through the deflection lumen and along the guide track inducing a first bend of the catheter body,

wherein the rack arm extends through the circumferentially extending slot of the thumbwheel to position the linear rack along the pinion gear,

wherein the stationary guide of the handle passes through the an arcuate opening of the thumbwheel to interface with the first major surface of the linear rack for holding the second major surface of the linear rack against the pinion gear.

28. (Previously Presented) The steerable catheter of claim 1 wherein the obliquely-extending rack arm positions the linear rack parallel to the longitudinal axis.

29. (Previously Presented) The steerable catheter of claim 28 wherein the guide track comprises a pair of track sides formed along a distal handle segment.